

**MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE**

**O.M. Beketov National University of Urban Economy in Kharkiv**

**APPENDIX**

**to the educational and scientific program**

**"ARCHITECTURE OF BUILDINGS AND STRUCTURES"**

**Level of higher education second (master's) level**

**Field of knowledge 19 Architecture and construction**

**Specialty 191 Architecture and urban planning**

**APPROVED BY THE SCIENTIFIC AND METHODOLOGICAL COUNCIL**

**Chairperson of the Scientific and Methodical Council**

**Grigoriy STADNYK**

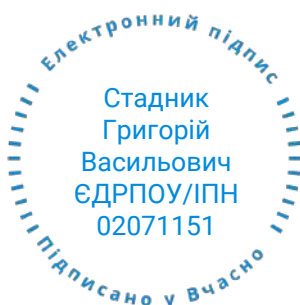
**(protocol № 9 of « 15 » \_June\_2023)**

**The appendix to the educational program enters into force  
during the period of validity of the relevant educational program.**

**It is an integral part of the educational program**

**The educational program comes into force on « 01 » September 2023**

**(Order № 204-01 of « 10 » June 2023)**



**Kharkiv – 2023**

**Погоджено:**

✓ Tetyana.Rischenko@kname.edu.ua

## APPROVAL SHEET

### to the appendix to the educational and scientific program

The appendix to the educational and scientific program is considered and approved by:

Department of Architecture of Buildings and Structures

Protocol № 12 of «29» May 2023.

Department of Innovative Technologies in Architectural Environment Design

Protocol № 6 of «10» May 2023.




Department of Urbanism and Urban Planning

Protocol № 12 of «26» May 2023.

Academic Council of the Academic and Research Institute of Architecture, Design and Fine Arts

Protocol № 4 of «13» June 2023

Developed by members of the support group for providing the educational and scientific program Architecture of Buildings and Structures

Last name, first name, patronymic of the head of the educational program and other developers	Job title	Signature
Olga Vyacheslavivna SMIRNOVA <i>Guarantor of the educational program</i>	Candidate of Science (Architecture), Associate Professor of the Department of Architecture of Buildings and Structures	
Natalya Ivanivna KRYVORUCHKO	Candidate of Science (Architecture), Associate Professor of the Department of Architecture of Buildings and Structures	
Olena Nikolaevna DUDKA	Candidate of Science (Architecture), Associate Professor of the Department of Architecture of Buildings and Structures	

# 1. Competencies and learning outcomes provided by selective educational components

Applicant for higher education chooses one of the three proposed blocks, three disciplines from the specialty catalog and one discipline from the university course catalog

<b>General competences (SGC)</b>
SGC -1* According to the chosen discipline from the catalog of university courses.
<b>Professional competences (SPC)</b>
<p>SPC-1. Ability to understand the specifics and trends of designing modern housing; development of the concept, understanding of techniques and methods of design and volume-planning organization of multi-functional buildings.</p> <p>SPC-2. Ability to understand the socio-cultural and urban planning context of adaptive reuse of historical objects, understanding and formulation of compositional problems in new construction in a historical environment.</p> <p>SPC-3. The ability to understand the general principles of the formation of energy-efficient buildings and the prerequisites for the formation of nature-integrated architecture, the definition of methods of architectural formation of nature-integrated architecture.</p> <p>SPC-4. Ability to understand the principles and their application in the formation of objects of media architecture and parametric design.</p> <p>SPC-5. Acquisition of skills in the implementation of architectural projects using innovative technologies and the introduction of the latest methods and modern trends in the development of the architecture of buildings and structures.</p> <p>SPC-6. Ability to understand the socio-historical context of religious cultures and their sacred environment.</p> <p>SPC-7. Ability to determine the prerequisites for the development of hybrid housing, to understand and determine the types of hybrids, to understand the architectural and planning organization and spatial composition of hybrid housing.</p> <p>SPC-8. Ability to use knowledge about composite materials, constructive solutions of composite structures for architectural objects; modern technologies and work during the repair of architectural objects.</p> <p>SPC-9. Ability to apply knowledge in practical situations regarding mineral furnishing materials, their properties, scope of application and features of operation.</p> <p>SPC-10. Acquiring the skills of presenting the results of one's own scientific research; the ability to apply innovative technologies to ensure architectural research.</p> <p>SPC-11. Ability to determine typological features, understanding the specifics of formation and modern trends in the development of the architecture of public and commercial complexes.</p> <p>SPC-12. Ability to understand the problems and features of designing skyscrapers and high-rise buildings.</p> <p>SPC-13. Ability to understand the peculiarities of design and typology of rehabilitation centers.</p> <p>SPC-14. The ability to understand the basic concepts, goals, and tasks of BIM of architectural objects, coordination of BIM projects and the possibilities of developing working documentation.</p>
<b>Learning outcomes (SLO)</b>
<p>SLO-1 To determine the typology and specifics of the formation of modern residential objects; develop concepts of a modern residential object; use techniques and methods of design for organizing the volume-planning solution of multi-functional buildings.</p> <p>SLO-2. Know and use knowledge of the broad context of adaptive reuse of historic buildings; understand the importance of architectural and legislative constraints that exist in design in a historic environment; to be able to investigate and define architectural and artistic problems, as well as identify limitations, apply appropriate methods of reconstruction and architectural</p>

regulation in a historical environment.

SLO-3 Use knowledge of general principles of energy-efficient building formation and methods of architectural design, techniques of integration of buildings and nature in the project process.

SLO-4. Understand the basic concepts and prerequisites of media architecture and parametric design; to be able to apply the principles of forming objects of media architecture and parametric design.

SLO-5. Use innovative technologies in the design of buildings and structures, understand the peculiarities of the formation of parametric architecture objects; to be able to determine the latest methods and modern trends of ecological design and development of the architecture of buildings and structures.

SLO-6. Know the methods of analysis, design and research of religious buildings and structures; use acquired knowledge and critically use scientific data in religious buildings and structures design.

SLO-7. Understand the needs of users and customers, as well as the importance of aesthetic issues in the design process, to be able to design varieties of hybrid housing considering perspective trends in the formation of a humane living environment.

SLO-8. Reasonable choose composite materials depending on the type of structure, its purpose, and operating conditions; know the main trends in the distribution of composite materials in architectural objects; demonstrate knowledge of the variety of latest technologies for the repair of architectural objects using polymer composites.

SLO-9. Conduct research activities; determine the physical essence of the properties of modern building and finishing materials, main types, characteristics of materials, possibilities of modern technology of their production.

SLO-10. Present the results of one's own scientific research; apply innovative technologies, software, and Internet resources for information support of architectural research.

SLO-11. Identify typological features, understand specific characteristics and modern trends in the development of public and commercial complexes, understand and consider social, ecological, ethical, economic, and commercial considerations when designing public and commercial complexes.

SLO-12. Determine the peculiarities of architectural formation and be able to design high-rise buildings and skyscrapers.

SLO-13. To understand the peculiarities of the architecture of rehabilitation centers, to be able to determine the composition of premises, functional blocks and to implement projects of rehabilitation centers of various types.

SLO-14. Understand the object of architecture as an information model, be able to coordinate BIM projects and develop working documentation.

SLO-15\*. According to the chosen discipline from the catalog of university courses.

## 2. List of selective educational components and their logical sequence

### 2.1. List of selective educational components (SC)

Course code	Selective components (academic disciplines, course projects (works))	Number of credits	Form of final control	Content modules
1	2	3	4	5
<b>2.1. Selective components,</b> that provide professional competences (the applicant of higher education chooses one block from the list)				
<b>Block SC 1 Modern trends in housing architecture</b>				
SC 1.1	Architecture of modern housing	4	Differentiated test	CM1. Classification and general principles of the formation of modern residential objects CM2. The specifics of the formation of modern residential objects CM3. Trends in the formation of modern residential objects in the 21st century
SC 1.2	Course work: Architecture of modern housing	2	Differentiated test	CM1. Analysis of architectural and town-planning prerequisites for the formation of a modern residential object CM2. Development of the general concept of a modern residential object CM3. Detailed development of a modern residential object
SC 1.3	Shape formation of multifunctional buildings	4	Differentiated test	CM1. Techniques for designing multifunctional buildings CM2. Methods of designing multifunctional buildings CM3. Spatial planning organization of multifunctional buildings
<b>Block SC 2 Renovation and adaptation of existing buildings</b>				
SC 2.1	Adaptive reuse of buildings and structures	4	Differentiated test	CM1. Methods of strengthening the constructions of existing buildings and structures CM2. Adaptive reuse of industrial buildings and structures CM3. Modern trends in the adaptation of buildings and structures
SC 2.2	Course work: Adaptive reuse of buildings and structures	2	Differentiated test	CM1. Analysis of urban planning, architectural and technical prerequisites for adaptive reuse of buildings and structures

				CM2. Development of the general concept of adaptation of the building CM3. Detailed development of the building adaptation project
SC 2.3	Artistic problems of the interaction of new and historical buildings	4	Differentiated test	CM1. Urban protection of the historical environment of cities CM2. Methods and approaches to the reconstruction of the historical environment CM3. Architectural and artistic problems of historical environment reconstruction
<b>Block SC 3 Architecture of sustainable development</b>				
SC 3.1	Bioclimatic architecture	4	Differentiated test	CM1. Planning and morphological features of bioclimatic architecture CM2. Types and features of gift energy CM3. Architecture of sustainable development and means of solving the consequences of climate change
SC 3.2	Course work: Bioclimatic architecture	2	Differentiated test	CM1. Analysis of urban planning, architectural and technical prerequisites for the formation of an energy-efficient building CM2. Development of a general concept of an energy-efficient building CM3. Detailed development of an energy-efficient building
SC 3.3	Methods of forming nature-integrated architecture	4	Differentiated test	CM1. Historical prerequisites for the use of natural components in architectural design CM2. Methods and approaches of forming nature-integrated architecture CM3. Methods classification of using natural components in architectural design
<b>Total selective components for block:</b>		<b>10</b>		
<b>2.2 Selective educational components</b>				
from the catalog of specialty courses, the applicant of higher education chooses one discipline from the catalog for the 2nd semester and two disciplines for the 3rd semester				
SC 4	Media architecture and parametric design	5	Exam	CM1. Basic concepts and prerequisites for the emergence of media architecture and parametric design CM2. Objects of media architecture and the principles of their formation

				CM3. Principles of formation of parametric design
SC 5	Innovations in the design of buildings and structures	5	Exam	CM1. Innovative technologies in design CM2. The latest techniques in design. Eco-architecture CM3. Modern trends in the development of the architecture of buildings and structures
SC 6	Architecture of confessional buildings and structures	5	Exam	CM1. Semantics of sacred architecture CM2. Features of the architecture of confessional buildings in world religions CM3. Basic principles of architecture of Abrahamic religions buildings (Judaism, Christianity, Islam)
SC 7	Architecture of hybrid residential buildings	5	Exam	CM1. Prerequisites for the emergence and development of hybrid residential buildings. Engineering hybrids CM2. Hybrid residential buildings with the possibility of home work CM3. Functional hybrids and modern trends in the formation of hybrid housing
SC 8	Composite materials and technologies in architecture	5	Exam	CM 1. Polymer composites used in the creation of architectural objects CM 2. Features of constructive solutions of composite structures for architectural objects CM 3. Technological processes of manufacturing composite structures for architectural objects and methods of their repair using composites
SC 9	The newest equipment and building materials	5	Exam	CM 1. Historical experience of using furnishing materials and products based on them CM 2. Mineral repair materials, their properties and applications CM 3. Modern repair materials of organic origin. Features of their operation
SC 10	Presentation of architectural projects	6	Exam	CM1. Psychological and social foundations of architectural project presentation CM2. Types and features of project presentation.

				CM3. Innovative means of architectural visualization and project animation
SC 11	Architecture of public and commercial complexes	6	Exam	CM1. Typological characteristics of public and commercial complexes CM2. Formation features of public and commercial complexes in the urban environment CM3. Modern trends in the development of public and commercial complexes
SC 12	Architecture of skyscrapers and high-rise buildings	6	Exam	CM1. Typology of high-rise buildings CM2. Features of designing high-rise buildings and skyscrapers CM3. Means of humanization of high-rise buildings and skyscrapers
SC 13	Features of the rehabilitation centers architecture	6	Exam	CM1. Basics of rehabilitation centers typology CM2. Design features of rehabilitation centers CM3. Modern trends in the design of rehabilitation centers
SC 14	BIM of architectural objects	6	Exam	CM1. Architectural objects as an information model. CM2. BIM project coordination. CM3. Development of project documentation.
<b>Total selective components for block 2:</b>		<b>17</b>		
the applicant of higher education chooses one discipline from the catalog of university courses				
SC 1*	Catalog of university courses	4,0	Differentiated test	
<b>The total amount of sample components:</b>		<b>31</b>		

## 2.2. Structure of selective components

The applicant of higher education chooses one of the three proposed blocks that provide professional competences. From the catalog of specialty courses, the applicant of higher education chooses one discipline from the catalog for the 2nd semester and two disciplines for the 3rd semester and one discipline from the university's course catalog for the 2nd semester.



Selective educational components	Selection conditions
<p><b>Block 1</b>  SC 1.1. Architecture of modern housing  (4 ECTS credits, Differentiated test)  SC 1.2. Course work: Architecture of modern housing  (2 ECTS credits, Differentiated test)  SC 1.3. Shape formation of multifunctional buildings  (4 ECTS credits, Differentiated test)</p>	<p>the applicant of higher education chooses one of the three proposed blocks that provide professional competences</p>
<p><b>Block 2</b>  SC 2.1. Adaptive reuse of buildings and structures  (4 ECTS credits, Differentiated test)  SC 2.2. Course work: Adaptive reuse of buildings and structures  (2 ECTS credits, Differentiated test)  SC 2.3. Artistic problems of the interaction of new and historical buildings  (4 ECTS credits, Differentiated test)</p>	
<p><b>Block 3</b>  SC 3.1. Bioclimatic architecture (4 ECTS credits, Differentiated test)  SC 3.2. Course work: Bioclimatic architecture  (2 ECTS credits, Differentiated test)  SC 3.3. Methods of forming nature-integrated architecture  (4 ECTS credits, Differentiated test)</p>	
<p>SC 4. Media architecture and parametric design (5 ECTS credits, Exam)  SC 5. Innovations in the design of buildings and structures  (5 ECTS credits, Exam)  SC 6. Architecture of confessional buildings and structures  (5 ECTS credits, Exam)  SC 7. Architecture of hybrid residential buildings (5 ECTS credits, Exam)  SC 8. Composite materials and technologies in architecture  (5 ECTS credits, Exam)  SC 9. The newest equipment and building materials  (5 ECTS credits, Exam)  SC 10. Presentation of architectural projects (6 ECTS credits, Exam)  SC 11. Architecture of public and commercial complexes  (6 ECTS credits, Exam)  SC 12. Architecture of skyscrapers and high-rise buildings  (6 ECTS credits, Exam)  SC 13. Features of the rehabilitation centers architecture  (6 ECTS credits, Exam)  SC 14. BIM of architectural objects (6 ECTS credits, Exam)</p>	<p>the applicant of higher education chooses one discipline from the specialty catalog for the 2nd semester and two disciplines for the 3rd semester that provide professional competencies</p>
<p>SC 1* Catalog of university courses (4 ECTS credits, Differentiated test)</p>	<p>the applicant of higher education chooses one discipline from the catalog for the 2nd semester</p>

### 3. Matrix of correspondence of competences to selective components

	SGC1*	SPC1	SPC2	SPC3	SPC4	SPC5	SPC6	SPC7	SPC8	SPC9	SPC10	SPC11	SPC12	SPC13	SPC14
SC 1.1		+													
SC 1.2		+													
SC 1.3		+													
SC 2.1			+												
SC 2.2			+												
SC 2.3			+												
SC 3.1				+											
SC 3.2				+											
SC 3.3				+											
SC 4					+										
SC 5						+									
SC 6							+								
SC 7								+							
SC 8									+						
SC 9										+					
SC 10											+				
SC 11												+			
SC 12													+		
SC 13														+	
SC 14															+
SC 1*	+														

#### 4. Matrix of providing learning outcomes (SLO) with the relevant selective educational components

	SLO 1	SLO 2	SLO 3	SLO 4	SLO 5	SLO 6	SLO 7	SLO 8	SLO 9	SLO 10	SLO 11	SLO 12	SLO 13	SLO 14	SLO 15*
SC 1.1	+														
SC 1.2	+														
SC 1.3	+														
SC 2.1		+													
SC 2.2		+													
SC 2.3		+													
SC 3.1			+												
SC 3.2			+												
SC 3.3			+												
SC 4				+											
SC 5					+										
SC 6						+									
BK 7							+								
SC 8								+							
SC 9									+						
SC 10										+					
SC 11											+				
SC 12												+			
SC 13													+		
SC 14														+	
SC 1*															+